Issue 56

June 2024

Utah Valley Amateur Radio Club

# The UVARC Shack

## A sign of the times

Yup, it's time to get back up on the roof and get your antenna installed and ready for an exciting summer!. Andrew Allred KK7LBS and Noji Ratzlaff KNØJI work together to install a Pockrus J-pole on the Allred home in time for nets and other VHF summer fun. Another happy customer.

## In this issue of the *UVARC Shack*

Club meetings feature EchoLink and DXing by the experts.

*My Shack* spotlights KL7KUY. *Amateurs in Action* off a Moab cliff. *Brass Tacks* on basic electronics, and what you need to know if you want to get started learning it.

*Dear Annette* on artificial SWR due to a lossy coax. *Hot Tips* for proper heat application. *DIY* for a 20-meter bandpass filter. *The Amateur in You* on how to get into ham radio and giving people the benefit of the doubt.

*Please send your ideas, stories, questions, gripes, and photos to* ***uvarcshack@gmail.com***

### Inside this issue

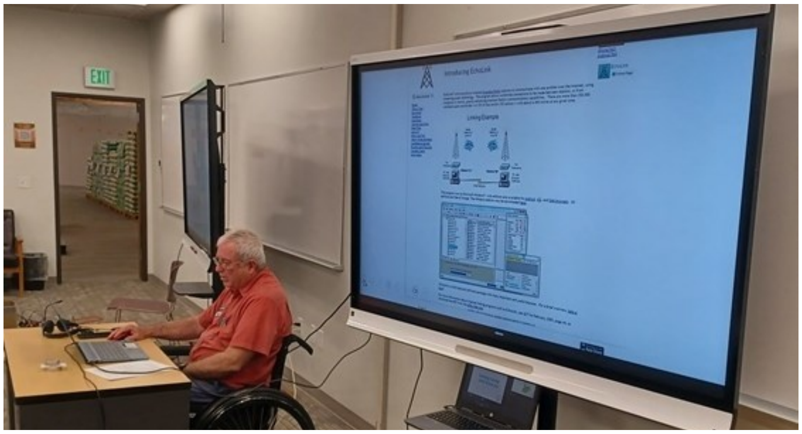


### Other points of interest

# Club meetings

***Recap***

## April 2024 club meeting – Getting Going with EchoLink



Jim Cooper W7KLA was so willing to provide an enjoyable, useful, and much-needed presentation on EchoLink with only a week to go before the meeting. We couldn't use our usual location at the Orem City Chambers, and scrambled to find another. Curtis MacPherson N1JDI came to our rescue with a connection to Chirine Wadsworth, owner of Sage and Plow, to use her classroom. Jim taught us the purposes of EchoLink, how to get started with is, how to use it, and pitfalls one might encounter. You can see a recording of the meeting, thanks to Trevor Holyoak AG7GX.

## May 2024 club meeting – Getting into DXing


John Mitton KK7L is our very own *Master of DX* (our designation, not his, he insists). Having won numerous DX awards, including DXCC, and closing in fast on the DXCC Honor Roll, John explained to a mesmerized crowd what DX is, what kinds of antennas work best for it, how to operate for DX, optimal DX conditions, and how to bust through the pileups. He showed us photos of his own radial-bound, ground-mounted flagpole antenna, with which he's circumnavigated the globe using his Icom IC-7300 and a 500-watt amplifier. A truly interesting presentation. You can see a recording of the meeting on this link, thanks to Trevor Holyoak AG7GX.

*By the way, many of our past meetings are recorded and posted on the club YouTube channel.*

# My Shack

***Highlighting the shack (ham equipment and room) of a member, to give others an idea of the possibilities that might work for them***

## Matthew Barnes, KL7KUY

Matthew Barns KL7KUY had his first introduction to amateur radio as a scout. His scout leader was a licensed ham, and had shown his troop some ham radio equipment and how it worked. Later, Matthew discovered the value of FRS and GMRS radio among family and friends. Eventually, he re-discovered amateur through a co-worker, Jon Eicher KE7DCL, while talking with others about ham radio.

Matthew started on his amateur radio path being interested in learning how far HF can reach, and the science of how these signals originate. Matthew had some good exposure to electronics in high school, and later in college while pursuing a computer science degree. Originally, he thought about building radios, but today he only has time for antennas.

*I've been a year into it now, and I'm currently learning (Morse) code, FT8, and I enjoy building stuff. I've enjoyed working POTA (Parks on the Air) with Dakotah Bishop KK7POC out at Camp Floyd State Park and Timp Cave National Monument. Going forward, I want to get into LoRa, DMR, and EmComm (emergency communication). Once I get me Extra, I'd like to get my dad into ham radio too.*

Matthew changed his major while in college, and graduated in IT, and now works in IT Security. His involvement with IT has only heightened his love for electronics, tinkering, and helping others do the same.

*My equipment includes:*

*Yaesu FT-710 HF transceiver*
*QRP Labs QMX HF transceiver*
*AnyTone AT-778UV dual-band mobile transceiver*
*Xiegu G90 portable HF transceiver*
*Pockrus VHF/UHF J-pole antenna*
*Diamond BB7V telescoping HF antenna*

Matthew's currently working towards his levels of certification in UCARES (Utah County Amateur Radio Emergency Service) and part of American Fork CERT (Community Emergency Response Team).

*— 73, Matthew*

# Amateurs in Action

***Recounts of ham radio operators who have used their effort and skills to help others in a time of need***

## Cliff hanger

It was about 2:30 pm Saturday 14 October, just hours after the 2023 partial solar eclipse. Adam Eckberg KD2MAL had just dropped off some supplies at the Base Camp aid station for the Moab 240 Ultramarathon. He was on his way back to headquarters when he spotted a vehicle that had fallen off the road near Hurrah Pass and into the ravine 100 feet below. *He called the incident in to me at Net Control, and KA7OLB (Chris Reed) got right on the phone to 911 to get help out there*, said Frank Liebmann K1LOK (now WX5LOK).

***Frank Liebmann K1LOK / WX5LOK***

It was a nearly new Dodge Ram TRX, which had to back up a bit to let an oncoming vehicle get by the narrow mountain dirt road. Unable to see very clearly, the driver backed up a little too far, and over the cliff he went. There was no cell service out there, so Adam's ham radio in his vehicle was the only communication lifeline back to civilization.

Both the San Juan County Sheriff and Moab Valley Fire responded, but were rather helpless to reach the vehicle without some serious equipment. One call to Trail Maters, however, brought the offroad assistance crew onto the mountain and down the ravine for the rescue.

Turns out the driver of the crashed TRX and his dog were pretty badly injured, but they did survive the fall, and as far as anybody could tell, he wasn't participating in the race in any way.

*There were several instances where we effectively used [ham] radio to get help out to places where there was no cell service. In one case, there was a saddled horse with no rider wandering around at 4:30 in the morning on the trail. In another case, a volunteer had a mechanical problem.*

You can read a little about it on CarScoops and TheDrive and on Yahoo! and see a video of the recovery on YouTube.

# New Hams and Upgrades

## New hams

KK7SBM = Thomas Talbot
KK7SFN = Larry Reynolds
KK7SFT = Martin Mayo
KK7SGK = Ronald Spencer
AI7XD = Ronald Browne
KK7SHP = Austin Garner
K7JRU = John Uibel
KK7SRQ = Robert Gardner
KK7SVI = Dallin Briggs
KK7SVK = Robert Bigelow
KK7SWS = Matthew Nelson
KF7IQL = Tefton Smith
KK7TAB = April Sullivan
KK7TAD = Edward Polakoff
N8TTT = John Magnusson
KK7TAF = David Gardner
KK7TBA = Brant Burnham
KK7TBB = Darrell Sego
KK7TBO = Nathan Terry
KK7TCQ = John Denney
KK7TCR = Clark Parker
KK7TCS = Christopher Bross
KK7TDK = Thomas Olsen
KD4ISY = Dawn Alton
KK7TDV = Ryan Camomile
KK7TEB = Margie Perkins
KK7TEE = Richard Perry
KK7TEN = Corey Bingham
KK7TEV = Spencer Anderson
KK7TFB = Dan Leber
KK7TFJ = EksAyn Anderson
KK7TFK = Beverly Clark
KK7TFL = Arn Perkins
KK7TGN = Jennifer Larsen
KK7THG = Zacharias Lambert
KK7THP = Wendell Hunt
KK7TMM = Teresa Resendiz Vazquez
KK7TMR = Inza Brown
KK7TOZ = Royce Hackett

## Upgraded hams

KK7POD = Cameron Porcaro (General)
K7ZHK = Nathan Stewart (General)
K7JRU = John Uibel (General)
KE7MBT = Jeffrey Anderson (General)
KI7BZF = Tyler Henry (General)
KW7NKW = Kip Warren (General)
KG1NNY = Virginia Weekley (General)
K7DMJ = David Johnson (Extra)
KI7RVE = Matthew Draper (General)
KK7AUG = Anthony Rowley (General)
KK7JNP = George Fish (General)
KF7KGR = Benjamin Loveridge (General)
KK7PFL = Tom Wilkinson (General)
KK7RGT = Tony Gonzalez (General)
KK7RKM = Mark Radandt (General)

**Congratulations to all these diligent folks! We look forward to hearing you on the radio soon.**

# Events

## *Upcoming happenings*


## Summer Field Day

As is our tradition, UVARC will be participating in Field Day Saturday June 22 through Sunday June 23. Our location this year will be at the same place as last year, up Trout Creek, about a quarter of a mile north off Highway 40, at an open location. Our Field Day Potluck will be hamburgers and hot dogs that Saturday afternoon the 22nd, and a sign-up sheet will be posted.

We'll need help from generous club members, to provide two RVs, in which we can establish our stations, and nearby antennas. And of course, we'll need help taking it all down Sunday at noon too. We also need three volunteers with the ability to tow the communication trailer, the club trailer, and the port-a-potty trailer. More details as we get closer.

## 76ers Annual Barbecue

Lynn Hancock K7LSH and Carl Pockrus WE7OMG have once again secured the pavilion at Highland Glen Park for our annual barbecue, this year on Saturday June 1, from 10 am to 3 pm.

If all goes as planned, we'll have an HF station set up for you to get on the air, a door prize drawing, and maybe even a fox hunt. If you'd like to contribute toward the food or door prizes, please get hold of Carl or Jeremy K7TEH. The address is 4800 Knight Ave, Highland.

## UVARC Ham Radio Fair

Our annual Ham Radio Fair, will be held 6:00 pm on Thursday July 18, in the large pavilion at Pheasant Brook Park, 400 N 800 W in Lindon. Families, friends, friends of your family, are welcome to check out the stuff, the stations, and the fun of amateur radio.

See how others set up an actual VHF or portable HF station, go-kit, and their antennas. Check out a solar solution, a digital station, how to program an HT, and what the possibilities are. And we'd love to have you volunteer your own setup or expertise!

## 76ers Annual Ice Cream Social

It's time once again for the 76ers Annual Ice Cream Social, at Leatherby's in Orem, 304 E University Parkway. Bring your family on Saturday September 7 at 1:00 pm, and join us for lunch and treats. They have burgers, fries, and deli sandwiches, as well as world-class shakes.

## UVARC 2024 Swap Meet

Heads up! The Utah Valley Swap Meet this year will be 9:00 am Saturday September 21, at the Spanish Fork North Park Pavilion, 1185 N 400 E. One of our few fund-raisers, entrance is $5 per person or $10 per family, plus $10 per half-table to display your wares. The fees are waived for outside clubs and service (ARES, RACES, CERT, etc.) groups who want to use our swap meet to promote their activities. Dave Becar KI6OSS said that he plans to hold an exam session just outside the pavilion, under the Laurel VEC. We'll post that info as we get closer.

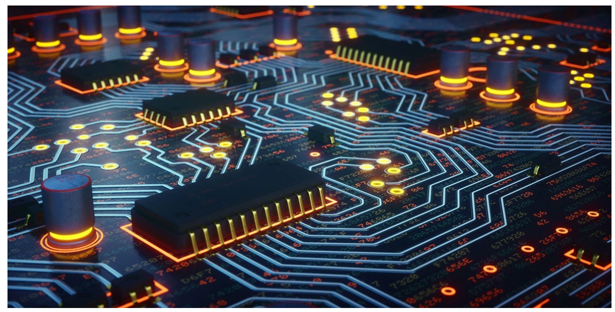
# Events

***Upcoming happenings***


# Brass Tacks

***An in-depth look at a radio-related topic***

## Getting started in electronics



Our world is surrounded by electronics, and it's fascinating what kinds of things we've been able to do with them, and how inseparable they've become from today's life. But electronics as a field of study is huge, and can seem a little overwhelming to jump into, especially when you consider that entire disciplines, businesses, and even college degrees, are built around it. Technologists have applied a variety of definitions to the craft, so I'll combine a mixture of electrical and electronic fundamentals to form the basis for our discussion.

Electrical engineering encompasses any study, device, or theory that's related to electricity, the behavior of electrical energy. Electronics is a sub-field of electrical engineering, and is more often associated with active devices (transistors, diodes, operational amplifiers, etc.) than passive components (resistors, inductors, capacitors, etc.) But, this discussion covers a general knowledge of some of their interdependencies, to best help you get started in understanding the basics. In your new-found adventure, you might not encounter all the topics discussed here, but chances are pretty good that you'll run into most of them.

### The scope

While the vacuum tube was probably the very first active electronic device, I'm not going to cover much about it, because it doesn't seem relevant to a person who's just getting started in learning about the craft today. Likewise, I've omitted other worthy electronic devices (SCR, TRIAC, thyristor, TVS, transistor variants) to limit the scope of our discussion. The goal is to provide you with the most exposure in the smallest amount of time.

While this discussion is primarily an introduction, the study of electronics requires some review of the basic math you learned back in high school, including algebra, logarithms, and complex numbers. As will be shown, the majority of the math is confined to Ohm's Law, KVL/KCL, and reactive components. I'll include links to more in-depth discussions on some topics.

### Circuit

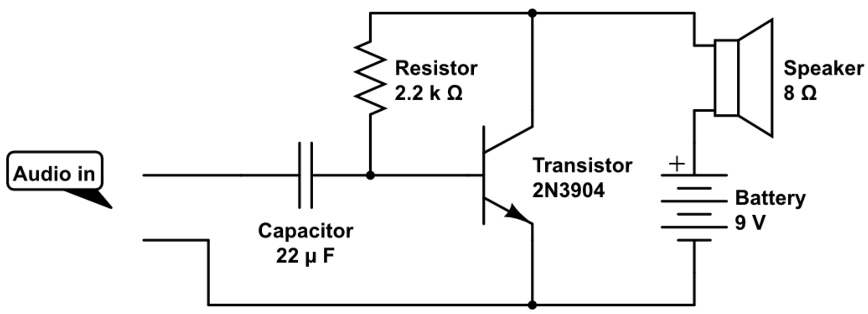
A conductor is an electrically conductive route for the travel of electrons, and can be wires, metal objects, your body, or any combination of these. A circuit is a completed pathway from a power source to a power drain, typically the same power supply, such as a battery. It's an interconnection of electrical conductors and components, such as a wire, a switch, and a light bulb. In such a circuit, if the switch is turned on, we say that the circuit is closed, and if the switch is turned off, we say that the circuit is open.

To help visualize how all the components are connected in a circuit, we use a set of standard pictographic symbols that represent the circuit pieces in a circuit diagram called a schematic. Further, each component is typically labeled on the schematic with a quantity that represents the component value relative to its type. An important point, schematic diagrams rarely dis-

# Brass Tacks

## *continued*

play the lengths of the wires or other conductors that connect the components. They do provide a consistent way of specifying circuit component connections that's easily understood by designer, builder, and troubleshooter.




*Schematic diagram, displaying common components and their interconnections*

### Power source

In the world of electricity, there are several kinds of electrical power, two of which are named DC (direct current) and AC (alternating current). DC means that current is flowing in one direction, while AC means that current is flowing in both directions. DC is the kind of electrical power that's provided by a battery, power supply, or solar panel. AC is provided by commercial power (house current), a generator, or an inverter.

For the purposes of this discussion, a ***power supply*** is a device (like the kind with which you would power your laptop) that converts AC electricity into DC. Much of electronic circuitry depends on DC, which you can typically draw from a battery or power supply.

### Resistor

A resistor is a passive (one that doesn't require electrical power to perform its function) device that opposes current flow; that is, the greater the resistance in a resistor, the lesser the current flow through it for a given voltage. From a slightly different point of view, the purpose of a resistor is to drop voltage.

### Ohm's Law

The association between ***voltage***, ***current***, ***resistance***, and ***power*** in a circuit are fundamental to the understanding of electronics, and their calculations form the building blocks of electrical mathematics. Known as ***Ohm's Law***, this relationship is manifest in two simple equations:

$$E = I \times R \text{ and } P = I \times E$$

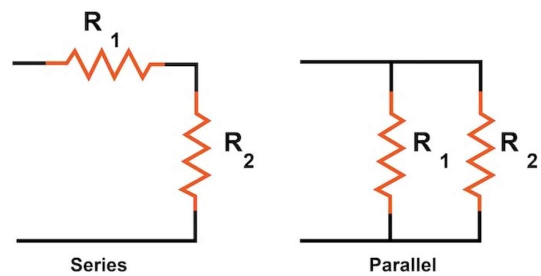
in which ***E*** is the voltage, measured in ***volts***, ***I*** is the current, measured in ***amperes*** (amps for short), ***R*** is the resistance, measured in ***ohms***, and ***P*** is the dissipated or required power,

# Brass Tacks

## *continued*

measured in ***watts***. The latter equation is often called the *Power Law*, although it's just another form of Ohm's Law. Basically, if two quantities are known, you're able to calculate the rest.

### Series circuit, parallel circuit




Two two-conductor components such as a resistor, inductor, or capacitor, are said to be connected in ***parallel*** if the two conductors ("leads") of one component are electrically connected across the two conductors of another component. Two two-conductor components are said to be connected in ***series*** if only one of the leads of one component is electrically connected to one lead of the other component. The effects of these are that the voltage across parallel components are the same and that the current through series components are the same.

### Impedance

The opposition to current flow in any type of circuit is known as impedance. In a circuit using AC power, the impedance can be affected by the AC frequency, depending on its components. The impedance of a purely resistive circuit does not depend on the AC frequency, while that of a reactive circuit can depend heavily on the frequency of the AC. The most important reactive components are inductors and capacitors, because the properties of inductance and capacitance make up reactance.

An inductor (such as coils, chokes, and transformers) is essentially a wire (short circuit) at DC, but exhibits increased reactance, and therefore more opposition to AC flow as the signal frequency increases. A capacitor is essentially an open circuit at DC (so does not allow DC current through it), but exhibits decreased reactance, and therefore less opposition to AC flow as the signal frequency increases. Together, an inductor and capacitor can filter out unwanted signals past them above or below a certain frequency range, allowing only signals within that range to pass through, a behavior we call tuning.

A transformer is an inductor that converts a voltage from one to another (higher or lower) value, or converts the impedance of one circuit to match that of another. By the use of mutual inductance, a transformer takes advantage of the interaction between two different inductors (which can be connected to each other in some way) due to the presented AC signal.

### Diode

The function of a diode is to permit current flow through it in one direction, but not the other. The diode was the first tube, then later semiconductor, electronic component. One of the first important uses of the diode was to convert AC into DC, a process known as *rectification*. A second very important use was to detect radio signals, meaning that, once the radio signal was received, the diode permitted only the positive-flowing signal to pass through, which is the necessary portion of the signal from which the audio signal was extracted.

A special form of diode is the ***LED*** (light-emitting diode), which gives off light when current is flowing through it. Another special form of diode is the solar cell, which converts light energy

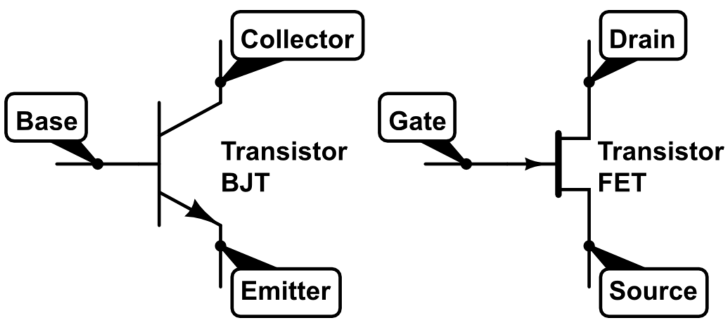
# Brass Tacks

***continued***

into electrical energy. Plus, there are others, such as the LCD, and more.

## Transistor

A transistor is an active device that controls the flow of current through it from one terminal to another, by means of a voltage or current (which I'll call the electrical "signal") applied to a third terminal. The two most general types are the FET (field-effect transistor) and the BJT (bipolar-junction transistor), each with its advantages. The two main terminals of a FET are labeled source and drain, with the third labeled the gate. The two main terminals of a BJT are labeled collector and emitter, with the third labeled the base. While there are NPN and PNP types of BJTs, and n-type and p-type FETs, I'll use the most generic of terms, to help you gain an overall understanding of transistor operation.




Typically, a transistor is used in two ways, as an amplifier and as a switch. A transistor is constructed such that the conductivity through it changes proportionally to the signal applied to the base (BJT) or gate (FET). Because the current through the device is typically much larger than the signal applied at the base or gate, the resulting current into the collector (BJT) or drain (FET) pin will be much greater in magnitude, but proportional to that at the input. This output signal strength being proportional to that of the input signal defines the function known as *amplification*, making the transistor in this case an *amplifier*.

On the other hand, rather than varying the transistor conductivity through an operating range, if we simply applied enough signal at the base or gate to make the device fully conductive (a state known as *saturation*), or remove the signal from the base or gate altogether to make the device non-conductive, that action defines the transistor as an *electronic switch*, the basic circuit of digital logic.

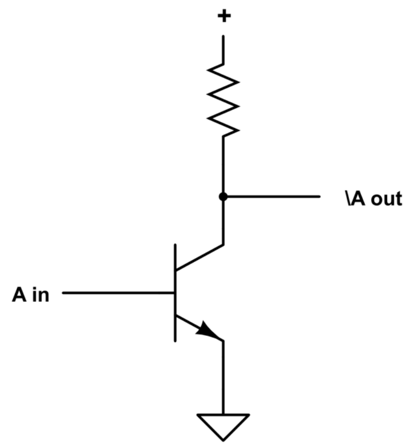
## Integrated circuit

An IC (integrated circuit) is a device made from a collection of other components, such as transistors, resistors, and capacitors. It's typically manufactured such that some or all of that collection is deposited on a single, small chip of silicon or similar non-conductor. We can create an IC that performs the inverter (logical NOT) function, but such a device only requires a single transistor, which might actually be smaller than the IC itself, not a very efficient use of resources. But we can manufacture an IC that contains three of them, for example, which is a much better use of the chip.

# Brass Tacks

## *continued*

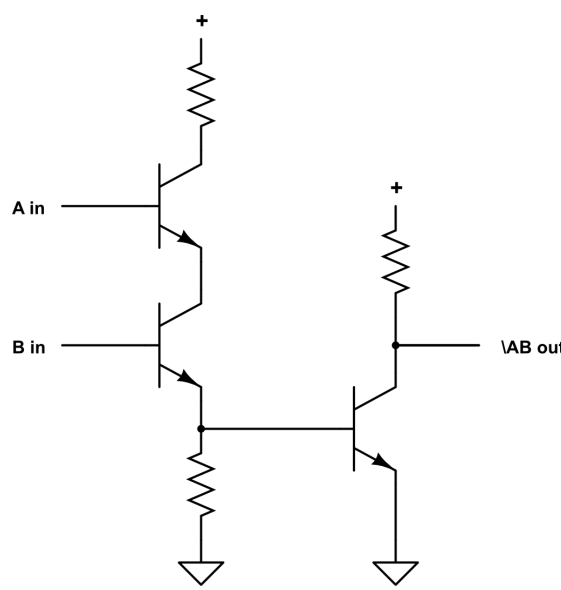
Each inverter consists of only a single transistor and a pullup resistor, to limit the current into the collector, as shown on the right.




In this configuration, if a logical HIGH voltage (5 volts, assuming TTL logic) is applied to the transistor base, the transistor becomes saturated, meaning that it's turned fully on, allowing current to flow through the transistor from the collector to the emitter. This allows the current from the 5-volt supply to effectively short to ground, and if it wasn't for the resistor limiting the current, that would likely burn up the transistor. But since the collector output is essentially shorted to ground, it's at nearly 0 volts, which is a logical LOW. So, the logical A in results in the logical \A out.

On the other hand, if a logical LOW voltage (0 volts) is applied to the transistor base, the transistor becomes an open circuit, and no current flows through it. And if no current is flowing through the pullup resistor, it does not drop any voltage, and the collector output is simply 5 volts, which is a logical HIGH. These two conditions, an applied HIGH resulting in an output LOW, and an applied LOW resulting in an output HIGH, define the ***inverter*** (logical NOT) function.

Let's take this idea a step further, and create a two-input NAND gate, an extremely useful device, and maybe even place a couple of them in an IC. The three-transistor circuit to the right is simply two transistors in series with each other, and with the now-familiar inverter transistor on their combined output.




In this case, you have two inputs, A on the top transistor base, and B on the bottom one. If A is HIGH, current can flow through the top transistor from its collector to the emitter, and if B is HIGH, current can flow through the bottom one. But as long as either A or B is LOW, its transistor prevents that current flow, and because the two transistors are in series, no current can flow through either of them unless both are on, which defines the logical AND function. And because of the inverter at their output, the entire device becomes a NAND gate, with A and B as inputs. We often manufacture this entire circuit on a single chip, an integrated circuit.

### Designing a circuit

Now that you have a basic understanding of the kinds of components that make up electronics, you can begin putting some of them together, to perform a useful function. We might be

# Brass Tacks

## *continued*

getting a little ahead of ourselves, because analyzing circuitry that's already been designed typically precedes any attempt to designing any ourselves. But, in the interest of brevity, it's my hope that your education will be enhanced by going straight to design.

Say your radio audio is clear, but it just isn't putting out the loudness that you'd hoped, even at full-blast, and you'd like to boost its sound somehow. A simple audio amplifier might be just what you need, so let's look at how we might design such a device using some of the electronics just discussed.

As previously mentioned we can create an amplifier from a transistor, assuming we know a few things about how a transistor works. Let's proceed with our design, step-by-step:

- We'll want to apply the low-audio current to the transistor base, and expect the transistor collector to reflect a much larger current
- The much larger current requires a current source, such as a battery, so let's connect the battery across the transistor collector and its emitter, to complete the path through the transistor
- Since we want to take advantage of that larger collector current, let's place a speaker inline between the battery and the collector
- The signal at the transistor base won't have any minimum voltage applied to it, to keep the transistor conducting during its operation, so we need to apply power to it. But, we can't simply connect the base to the battery, or the signal will be compromised. So, let's connect a resistor between the power source and the base, an application known as a *bias*. But to add a little trick (called a shunt feedback, providing a negative feedback bias) to the circuit, let's use the voltage that's showing at the collector instead, so that the collector voltage will actually provide some feedback into the base, which will help stabilize the signal. (Because, as the collector current rises, the feedback current reduces, etc.)
- To keep the current at the base small (under 5 mA, to satisfy the transistor's specification), the resistor value should be

$$\mathbf{(9\ V)\ /\ (4\ mA) = 2.25\ k\ ohms}$$

A common and convenient value near that is 2.2 k ohms, which will make the current

$$\mathbf{(9\ V)\ /\ (2.2\ k\ ohms) = 4.09\ mA}$$

To keep from burning it up, considering the size of the resistor is also important.

$$\mathbf{[(9\ V)^2]/(2.2\ k\ ohms) = 37\ mW},$$

so a **1/4 W** (250 mW) resistor will be adequate.

- The input signal, the transistor, and the battery all need a reference line that we'll call a signal ground, a kind of reference for our circuit, so we'll connect the input ground, the transistor emitter, and the battery negative terminal together, and call that our ground
- Also, the input signal is pretty much unknown, except its (audio) frequency range, so let's

# Brass Tacks

***continued***

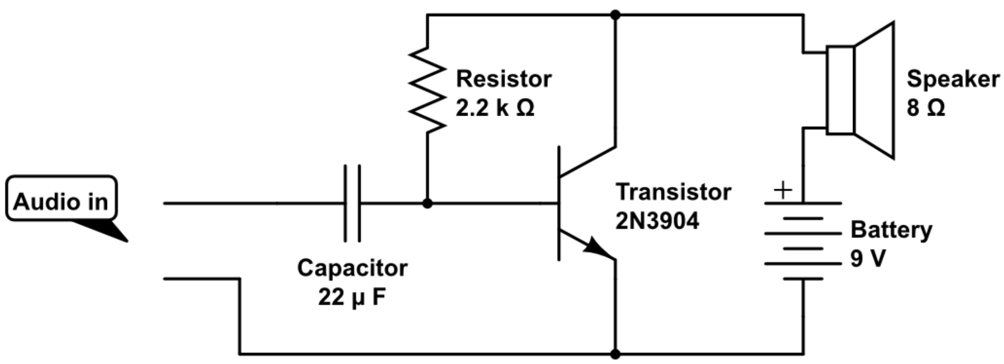
remove any DC signal it might apply to the transistor base by placing a capacitor in series between the input and the base (because DC can't flow through a capacitor)

- Finally, the value of the capacitor should allow for an audio-frequency signal to pass through, so let's assume a frequency well below 20 HZ, the bottom limit of human hearing. The "corner frequency" $\mathbf{f_c}$ for that capacitor-resistor pair is defined as

$$\mathbf{f_C = 1/(2\pi RC)}, \text{ so } \mathbf{C = 1/(2\pi Rf_C)}$$
$$\mathbf{= 1/[2\pi(2.2\text{ k ohms})(4\text{ Hz})] = 18\ \mu F}$$

A reasonable capacitance value for an off-the-shelf capacitor close to that value would be **22 µF**.

Once you've connected these together on a breadboard according to this schematic, you might want to try it out by connecting the input to your radio or your phone through a suitable plug, for example:




## Finally

That should get you started. But, if all of this sounds like a headache waiting to happen, please know that there are quite a lot of electronics design tools available to help you. They typically have drawing building blocks, interconnections, and can run simulations on your design, to ensure what you've envisioned will actually work, and even provide you with component values and much more.

## Summary

Getting a start into electronics requires a basic knowledge of how some electrical parts work, and then an understanding of how to connect them to form a useful function. All the different parts of electronics can seem confusing collectively, because so many things are involved. Yet, they can work together in an orchestrated fashion to perform a useful function. If the math seems discouraging, there are software tools that can help make the job easier.

*Noji Ratzlaff, KNØJI (kn0ji@arrl.net)*

# Dear Annette

***What's on your mind? Serious, humorous, technical, and thoughtful answers to your deepest, (mostly) ham-related questions.***

Dear Annette:

I've read that a lossy coax cable can make your SWR seem too good to be true. Could you please explain how that works? Maybe I'm not using the right words, but I can't seem to find anything online that can explain it to me.

Dale in Salt Lake City

Dear Dale:

Yes, a lossy transmission line, such as coax, can lead you to believe your antenna exhibits lower SWR than it really does. Let's say you have a transceiver that's set to transmit on 2 meters at 100 watts, it's connected by 67 feet of RG-8X without a tuner to your poorly matched antenna that exhibits a 3.0:1 SWR. According to the **coax loss chart**, RG-8X exhibits 4.5 dB loss per 100 feet at 2 meters, or 4.5 dB × (67 ft / 100 ft) = 3.0 dB loss.

After losing 3 dB (half) of its power in the coax, your 100-watt signal reduces to 50 watts by the time it reaches your antenna. Once at your antenna, the 3.0:1 SWR means some of its signal power is reflected back toward your transceiver, as determined by the *reflected power versus incident power ratio*, a derivation of the well-known *reflection coefficient*:

$$\frac{P_{\text{reflected}}}{P_{\text{forward}}} = \frac{P_r}{P_f} = \left(\frac{\text{SWR} - 1}{\text{SWR} + 1}\right)^2$$

Then, solving for SWR, you get

$$\text{SWR} = \frac{1 + \sqrt{P_r / P_f}}{1 - \sqrt{P_r / P_f}}$$

According to the first equation above, the reflected signal from the 50 watts at the moment it arrives at your 3.0:1 SWR antenna results in a reflected signal strength of

$$P_r = \left(\frac{3-1}{3+1}\right)^2 (50 \text{ watts}) = 12.5 \text{ watts}$$

at that point. This 12.5-watt signal now returns to your transceiver by the same cable and loses 3 dB, leaving 6.25 watts incident upon your transceiver. By the second equation, the resulting SWR measured at your transceiver will now be

$$\text{SWR} = \frac{1 + \sqrt{\frac{6.25 \text{ W}}{100 \text{ W}}}}{1 - \sqrt{\frac{6.25 \text{ W}}{100 \text{ W}}}} = 1.67 : 1$$

which makes your antenna ***appear*** better-matched than the 3.0:1 you had originally measured for it. Just for comparison, if your coax was LMR-400 (1.5 dB loss per 100 feet, much lower loss) instead, the apparent SWR from the same antenna would then have been

$$\text{SWR} = \frac{1 + \sqrt{\frac{16 \text{ W}}{100 \text{ W}}}}{1 - \sqrt{\frac{16 \text{ W}}{100 \text{ W}}}} = 2.33 : 1$$

a little closer to reality. Based on what we're seeing here, it seems that SWR is a fairly important property to address when considering antennas and transmission lines. But if that's the case, then why didn't the old timers 60 years ago ever worry or even talk much about SWR? It's because *they didn't use coax.*

*Got a question for* Dear Annette*? Email it to* ***uvarcshack@gmail.com*** *and include your town name. Sorry, no guarantees.*

# The Amateur in You, Part 1

***What have you been pondering?***

## How to get into ham radio

You know about amateur radio, otherwise known as “ham” radio, and now you’d like to find out just what it’s going to take to get into the craft. Let’s cut to the chase. You need three things: a license, radio equipment, and knowledge, and *it doesn’t matter in what order you get them*.

### License

To get a ham radio license, you need to pass the license exam, which is not as scary as it might sound. You can enroll in a ham radio course, which can prepare you, but attending one is not necessary. You’re free to study the material on your own. Here’s how:

- Use the Recommended Study Method, which is free and has helped thousands.
- When you’re getting around *90% Aptitude* on the Practice Tests, locate a testing center. You can also take an exam remotely if you’re willing to do it from an isolated room, like your bathroom.


UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
AMATEUR RADIO LICENSE
KI7WQC

SINGERMAN, MATT
683 S WILLOW LN
MAPLETON, UT 84664-5605

FCC Registration Number (FRN): 0027428085

- Once you pass the exam, the FCC will email you a link to pay the $35 exam fee.
- Once you pay the fee, your license and call sign should show up in the ULS (use your FRN to search) in a couple of days.

### Radio equipment

You don’t need much in the way of radio equipment to get started, but you do need *something*. Here’s a minimal list:

- Purchase a Baofeng UV-82 ($39) or Baofeng UV-5R ($19).
- Purchase a Signal Stick antenna ($22).
- Register for a free login at RepeaterBook and look up the repeaters in your area.
- Purchase a programming cable ($15).
- Download and install the free CHIRP software onto your PC.
- Download a CHIRP template (the IMG file) for your radio frequencies, replace already-populated repeater frequencies in the template with those you found on RepeaterBook, and program them into your radio. If don’t see a template designed for your area, no problem; just pick any and start replacing the frequency entries.
- Programming a radio can be tricky, so if you run into any issues, reach out to a mentor, either somebody you already know, or one of ours.


### Knowledge

Take a class, even if you’re already licensed; it’s good to know a little more about what it was you memorized. Train yourself on best practices; learn what to say and how to say it when you’re talking on the radio. Even when asking questions online, it’s good to know how to ask them, to draw out the most meaningful responses from others.

# The Amateur in You, Part 1

## *Continued*

Although at this point you've learned a lot, don't assume that you know as much as you feel you do, because amateur radio has a lot more to it than meets the eye, from basic to technical. You don't need to know much, but you should know the basics. Here's how to get those basics under your belt:

- Browse the questions on the New Ham page, especially those that address Best Practices.
- Self-train on all basic aspects of ham radio. Learn the Phonetic Alphabet.
- Get more in-depth training on ham radio knowledge, if you're so inclined. *This link is for those who want more than a high school education in ham radio.*
- Join ARES and become trained in their certification levels.

- Seriously, enroll in a course. The fun, hands-on instruction will likely last you a lifetime.
- Many hams enter the craft with the belief that one radio has a better *range* than another. Your radio knowledge will be enhanced once you realize that the difference in radio range is experienced by your location, your obstructions, and your antenna.

### Finally

Once you've gotten the three basic ingredients (license, radio, knowledge) behind you, the thing you'll need more than anything is ***experience***. Get on the radio, throw your call sign out on the local repeater, check into a net, but among the most important things

you can do is join a ham radio club. Associating with a club might seem a little old-school, but can bring you together with other hams locally, who either understand your struggles or can answer questions you might not know you had about your new-found craft.

Once you've done all of that, volunteer to help or train somebody else. If you haven't ever approached it this way, you might be surprised just how much you can learn, and quickly, by teaching others. No matter how you address training, always make ***kindness*** your guiding principle. It'll also help you improve in important areas of teaching, such as eye-contact, presentation, and patience.

# The Amateur in You, Part 2

***What have you been pondering?***

## Give people the benefit of the doubt

In all your online adventures, you might have come across somebody who has asked a very rudimentary question, like ***What frequencies can I use on ham radio?*** Your first inclination might have been to answer the person by drawing from your own deep pool of wisdom and experience. But after a second or two, you might also have begun to wonder where this question came from. I mean, ***shouldn't he already know this? Didn't he take a ham radio course like the rest of us? Wasn't that question on the exam?***

When we do encounter a question as seemingly simple and fundamental as this one, we have two options: **1) offer a helpful and intelligent answer**, or **2) let somebody else answer**. When we choose to answer the question, we should give the person what we call the ***benefit of the doubt***. That old phrase means that, *since we might not know the origin or background of the question, we should presume the person asking does have some baseline knowledge of the topic*, and maybe is looking for further information.

In college, we're taught that we write essays and articles geared toward a particular audience. We can't know exactly what our audience will know in advance, while writing the paper, so we're also taught that we must presume that our readers are ***intelligent but uninformed***. When answering people's questions, our habits should reflect that same approach and attitude, that our listeners are ***intelligent but uninformed***.

What this means is, belittling or berating a person for asking a seemingly fundamental question is completely inappropriate in any kind of setting. Telling the person to **RTFM *(read the flippin' manual)***, or to Google for the answer, or to get licensed, is not in keeping with the spirit of amateur radio. It's much better to point out in the manual where you got the information, or what links to visit. Often, a person who's new to the craft *might not even know* what questions to ask, let alone know what to Google for.

For the question that was asked above, ***What frequencies can I use on ham radio?*** It's very possible that the person is unlicensed, and is investigating whether to get into the hobby, maybe to satisfy a communication need. It's possible that the questioner is disabled, very young, or elderly, and does not have the same access to information that you do. It's also possible that his native language is not English, or that he has a learning issue.

Finally, it's possible that the person has passed the exam, but missed this particular question. I mean, did you get a perfect score on the exam? If so, congratulations! But the overwhelming majority of normal candidates did not. And why not? There can be a number of reasons, but again, I will presume that it's because they are intelligent, but were uninformed...or just forgot.

# Hot Tips

***Good info for the new ham, and old stuff to refresh your memory***

## Proper tool heat application

Some things require heat to apply or install them. But their integrity can become compromised when the heat is applied improperly. Here are some tips on applying heat in the right ways, to ensure a good application.

### Soldering

The melting of metal to permanently connect two or more electrical components requires practice.

- Before anything, select the best solder you can purchase, like Kester 24-6040-0027 solder. A cheaper brand might take too long to melt or might appear grainy or brittle.
- Stabilize the joint by connecting the clean wire(s) to the metal connection (post or terminal to which you're connecting the wires) and hold them in place by something like some helping hands.
- Use a hot soldering iron or soldering gun. The metal connection can act like a heat sink, meaning, it might prevent solder from reaching a high enough temperature long enough to make a good solder joint. Your soldering iron should be able to melt the solder while much of its heat is being drawn into the metal connection.
- Once your soldering iron is hot enough, clean the **heat surface** (the flat place on your soldering iron tip that you plan to solder with) by wiping it ***quickly*** on a damp paper towel.
- Immediately "tin" the heat surface with a **touch** (not a blob) of solder. Traditional soldering education trains us to heat the joint, not the solder, but you need plenty of surface area to allow the heat to flow to the joint, and first tinning the heat surface will accomplish that.
- Place the heat surface as flatly and closely as possible to the point where the wire(s) contact the metal connection. At nearly the same time, feed the solder into the same joint.
- As soon as the solder has flowed over all connected surfaces, stop feeding the solder and remove the soldering iron from the joint. *Do not blow on the solder*.

### Heat shrinking

Applying heat shrink tubing seems fairly straightforward and simple, yet here are a few things that you should keep in mind.

- Select good quality heat shrink tubing that reduces to 2:1 or 3:1 its purchase size.
- Use a heat shrink gun that heats up very hot very quickly.
- Cut an appropriate-length piece of tubing that's a little larger in diameter than the joint and all the wires you want to cover.
- Slip the tubing around one of the wires of the joint before you solder the joint.
- After soldering and cooling, turn on the heat shrink gun and wait a few seconds until it's at maximum heat.
- Apply the heat shrink gun blast directly onto the heat shrink tubing, about an inch away from the tubing. Do not shake the gun, as though you're spray painting something; instead, train the gun evenly across the entire surface of the tubing once.
- Once the tube is shrunk, remove the heat; do not train the heat onto the surface any longer, or the underlying insulation and other materials can melt.

### Finally

Each application should be used at high temperature for effective work. But, because of the high temperatures, each application should be done quickly, which takes practice.


# DIY

***Worthwhile projects you can build on your own***

## 20-meter bandpass filter

Every year, without fail, one of the most frustrating obstacles we face as a club participating in Field Day is interference from our own stations. Even though we closely coordinate operation among our several bands, our geographically close proximity to each other often results in considerable RFI from harmonic products of the transmitted signal. Solving this problem requires a device that can filter out the interfering signals, but allow the signals within the band of interest to "pass" through, and oddly enough, is known as a ***bandpass filter***, or BPF.

The two bands that appear to require a BPF the most seem to be the 20-meter band and the 40-meter band, although each band we operate should ideally have its own. Let's discuss the design for a 20-meter BPF as a starting point, then entertain a 40-meter BPF later. The largest drawback of this project is its single-band application, because if two Field Day stations need to switch bands, then the two stations also need to physically swap their BPFs, which can be cumbersome. Keeping those limitations in mind, let's see what it'll take to build one.

The design of this BPF is a three-pole Butterworth type, patterned after a design posted on ARRL. The entire circuit is an SO-239 connector on one end, connected to a parallel LC pair at the input, then to a series LC pair in the middle, to another parallel LC pair at the output, which finally terminates at another SO-239 connector. The design goals are to maintain a 50-ohm impedance within the passband, exhibit very little insertion loss, and handle 100 watts.

### Parts list

One 4.75″ x 2.6″ x 1.6″ aluminum enclosure

Three T-68-6 powdered iron toroids

Two SO-239 bulkhead connectors

40 inches of 20 AWG solid magnet wire

6 inches of 22 AWG stranded wire

Four M3 x 16 mm pan head machine screws

Four 6 mm x 3.1 mm ID aluminum spacers

One 2″ x 3″ prototype board

Two 500 pF 500 VDC mica capacitors

One 50 pF 500 VDC mica capacitor

6 inches of 12 AWG solid copper wire

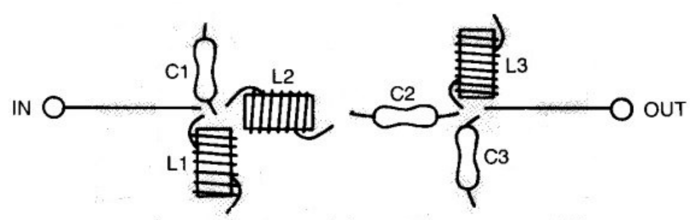
Two 16 AWG #4 stud ring terminals

Twelve each M3 screws, split washers, nuts

Small heat shrink tubing, fine sandpaper

### The construction

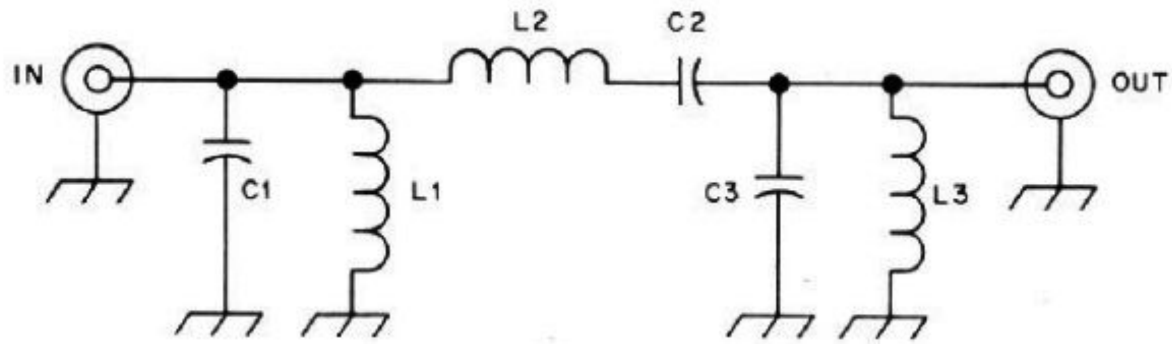
Tightly wind two of the toroids (L1 and L3) with eight turns of the 20 AWG magnet wire (each cut about 8½″ long), and one of the toroids (L2) with 25 turns (about 21″ long). And no, it doesn't matter in which direction you wind them. C1 and C3 are the 500 pF capacitors and C2 is the 50 pF capacitor. Lay out the components on the prototype board as in the drawing to the right, for convenience:

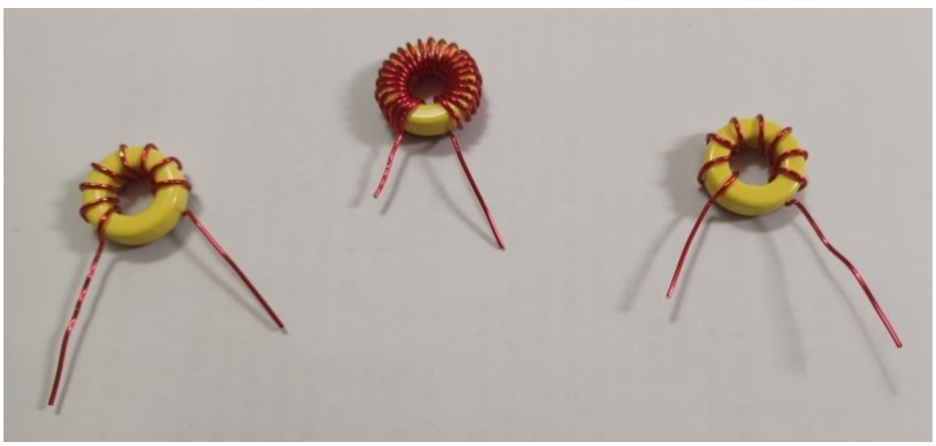



(No problem if you'd rather lay them out differently, as long as the connections follow the schematic on the next page.)

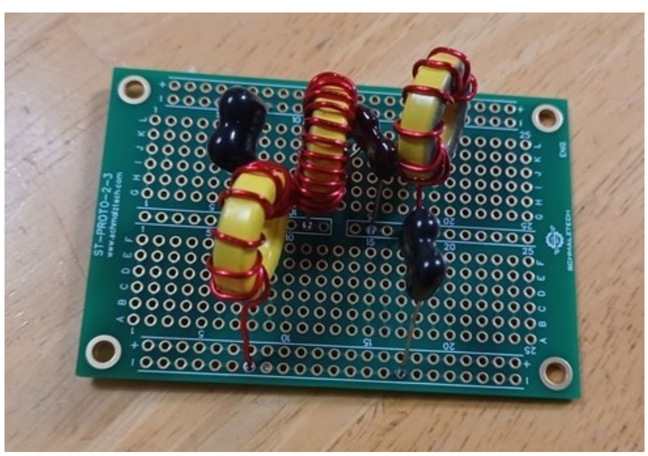
# DIY, continued

## *20-meter bandpass filter*



Solder one end of L1 and C1 to each other, and the other end to the ground bus. Repeat this with L3 and C3. Solder one end of L2 to the L1/C1 non-ground junction and the other end to one end of C2. Solder the other end of C2 to the L3/C3 non-ground junction. Wire the two ground buses together with a piece of 22 AWG wire. (I wired mine on the underside.) Solder two 2″ pieces of 22 AWG wires to a #4 ring terminal, then solder each wire to one of the



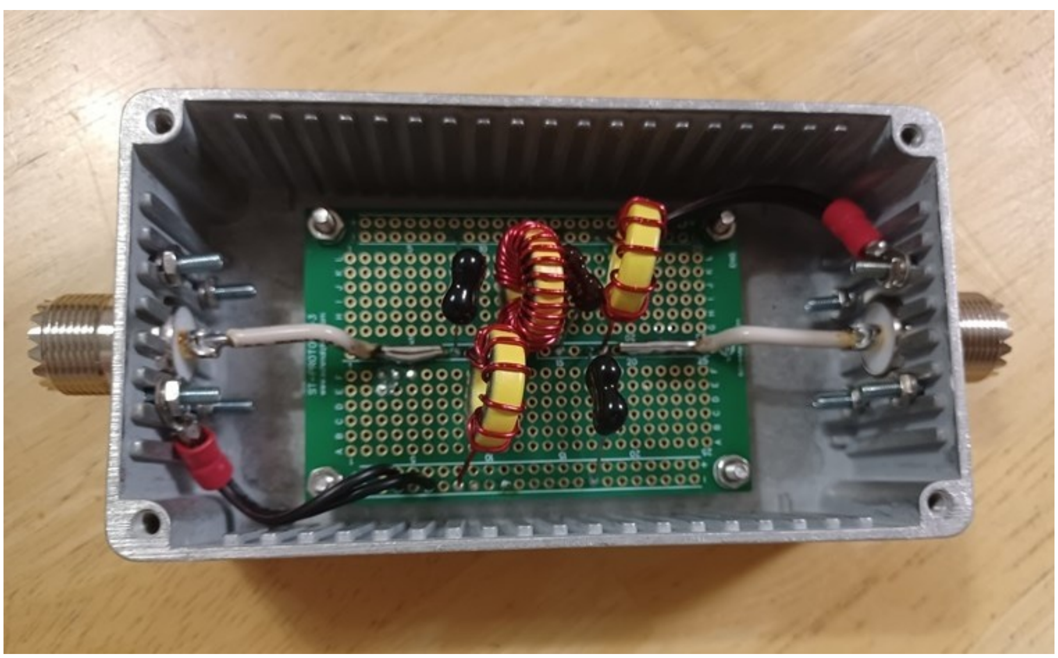
# DIY, continued

## *20-meter bandpass filter*

ground buses. Repeat the #4 ring terminal ground connection for the other end.

Drill a 9/16" hole in the enclosure at each end. For each 9/16" hole, place the solder cup end of one of the SO-239 bulkheads into the hole on the outside of the enclosure, and using the four mounting holes of the bulkhead as a template, drill a 1/8" hole for each mounting hole. Assemble the bulkhead onto the enclosure using the M3-0.5 mm hardware, then repeat for the other end.

Lay the prototype board on the outside bottom of the enclosure to measure, then drill out the four mounting holes with a 1/8″ bit. Install the prototype board to the inside of the enclosure using the M3 hardware and spacers. Bolt the #4 ring terminal of a 22 AWG wire pair to one of the M3-0.5 screws of one bulkhead inside the enclosure. Repeat all this for the other bulk-head.



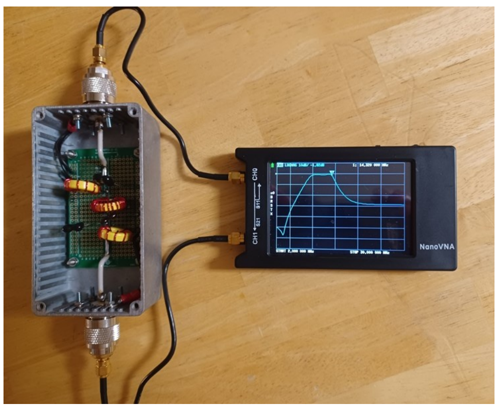
# DIY, continued

## *20-meter bandpass filter*

Plug a PL-259 connector into one of the SO-239 bulkheads for a heat sink. If you don't plug in a connector, soldering the cup in the rear of the bulkhead can get hot enough to melt the dielectric, especially if you're using a low-wattage (under 60 watts) soldering iron. Strip the ends of a 3″ piece of 12 AWG solid wire, solder one end to the solder cup of the SO-239 bulkhead connector, then apply a piece of heat shrink tubing over the solder cup. Solder the other end of the 12 AWG solid wire to its nearest L/C non-ground junction on the prototype board. Remove the PL-259 connector and repeat this on the other end. Time to check it out.

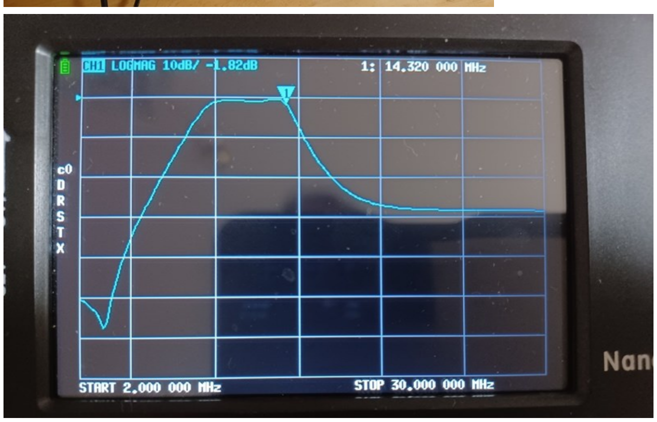
### Testing the filter

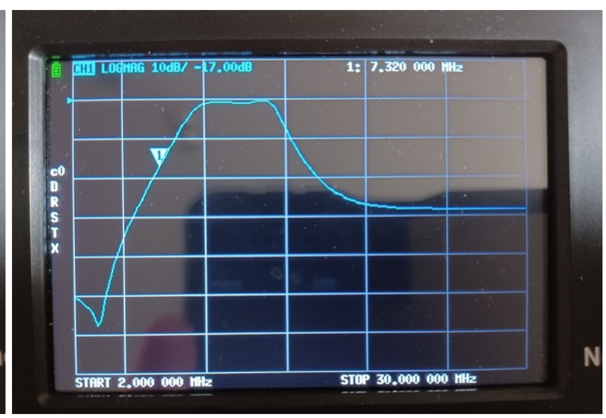
Simply connect the two SMS ports of a NanoVNA-H4 across the bandpass filter, as shown.



Set up the NanoVNA as follows:

- Tap the upper-right corner of the screen
- Tap **DISPLAY**, then **TRACE**
- Remove all but **TRACE 1** by tapping them
- Tap **BACK**, **BACK**, **STIMULUS**
- Tap **START**, **2 . 0 M**
- Tap the upper-right corner of the screen
- Tap **STOP**, **3 0 . 0 M**
- Tap the upper-right corner of the screen
- Tap **BACK**, **MARKER**, **SEARCH**, **MAXIMUM**
- Move the marker by turning the scroll wheel.



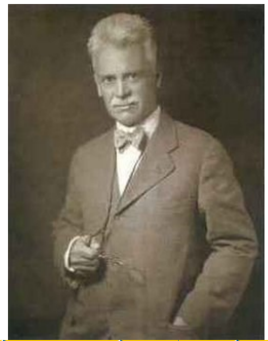




The left photo shows the expected frequency response. The marker is set at the upper end of the 20-meter band, and rolls off sharply after that. The entire 20-meter band falls within the pass band, exhibiting 1.75 dB attenuation or less. The right photo shows the marker at the high end of the 40-meter band, which shows 17 dB of attenuation, meaning that the filter is allowing no more than 2% of any 40-meter signal at that frequency to get through, and a signal of any other 40-meter frequency will be attenuated even more.

*Noji Ratzlaff, KNØJI (kn0ji@arrl.net)*

# Living in the Past

***Historical perspective***



## The Newton of electricity

A prosperous merchant in Lyon, France, in the 1770s, Jean-Jacques Ampere was one who did not believe in exposing his children to a formal education, but rather one obtained through self-study and access to published information. Thus, his son Andre-Marie Ampere had little traditional schooling, but absorbed his father's rich library of the world's knowledge at the time. Indeed, Andre not only embraced history, philosophy, travels, poetry, and the natural sciences, but began studying advanced mathematics as early as age twelve.

During the French Revolution, when Andre was 18 years old, his father was guillotined for resisting the political tides of the day. A few years later, Andre married, and took his first real job teaching mathematics. In 1802, due to the swiftly moving changes imposed by the Revolution, he was named professor of physics and chemistry, which accelerated his scientific maturation. After the passing of his wife, Andre moved to Paris, where he was appointed professor of mathematics, but also taught courses in astronomy and philosophy, and by 1824 was elected chair of experimental physics at College de France.

In 1820, Andre became fascinated by the discovery of Hans Christian Oersted regarding the connection between electric current and magnetism, and began devoting time to investigating this phenomenon by identifying their mathematical and physical relationships. He took Oersted's experiments further, and discovered that current-carrying electric wires attracted or repelled each other, depending on the directions of their currents, formulating a concept known today as ***Ampere's Law***, one of Maxwell's four fundamental equations.

$$\nabla \times \mathbf{B} = \mu_0 \mathbf{J}$$

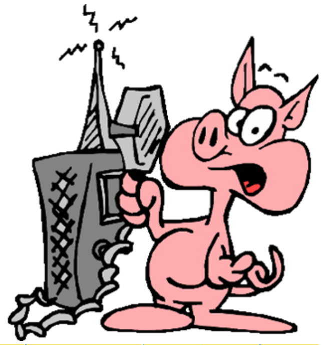
This formed the foundation for what Andre called *electrodynamics*, which today we recognize as classical electromagnetism. Using this physical explanation of electromagnetic behavior, Andre developed a physical account of electromagnetic phenomena that was both empirically demonstrable and mathematically predictive. It wasn't until 1915, nearly a hundred years later, that Albert Einstein and Wander de Haas proved Andre Ampere's hypothesis correct. However, probably the highest recognition came from James Clerk Maxwell, who referred to Ampere as the *Newton of electricity*.

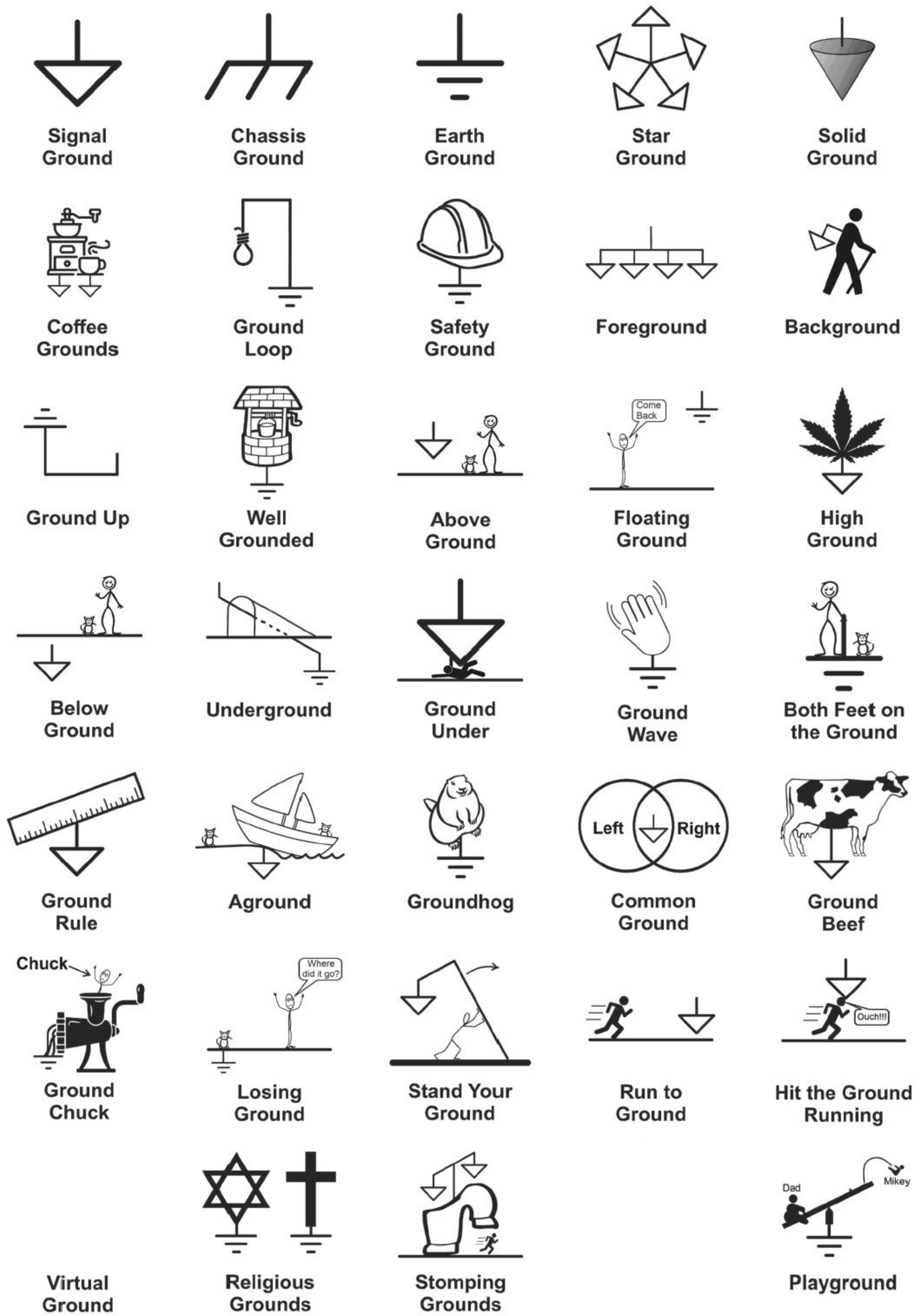
Through his experimentation, it became apparent to Andre that an elementary influence was responsible for the effects he had measured and calculated, and he proposed the existence of what we call today the *electron*. Other notable achievements by Andre Ampere included the discovery of the element Fluorine. He devised one of the first charts that listed elements by their properties, the forerunner of the Periodic Table.

Today, the SI base unit for current (the ampere, symbol "A") was named in Andre's honor. You can read more about his life and achievement history on the Famous Scientists website.

# Side of Bacon

***A little ham humor***





# For Your Insight

*Information you could use*

## Club meeting format

Here's the usual agenda for club meetings, at the Orem City Council Chamber Room, 56 N State St:

Talk-in frequency on the club repeaters

**6:30 pm** : Eyeball QSO

socialize / put faces with call signs

radio programmers available to help you

**6:45 pm** : Call the meeting to order

meeting lineup (agenda)

announcements / calendar / new hams

**7:00 pm** : Discussion / presentation

**7:45 pm** : Door prizes

**7:55 pm** : Dismiss and disassemble

**8:00 pm** : *Club QSY* to a local eatery

*Something you'd like to see at the meetings?*

Thanks to Heath Stevenson for making our monthly meetings possible!

## Monthly meeting help

We're grateful for the volunteers who help with various tasks that make our club night just that much more friendly and useful to everybody. Monthly, we need help with

programming radios (thanks, Ralph!)

taking photos or videos during the meeting (thanks, Joe!)

setting up tables and chairs (thanks, Heath!)

## Lynx

*Websites for your education and leisure*

Ham Radio Equipment

Ham Radio Nets

Radio Programming

Complete ham radio education

Net Training Topics

76ers Group and UVARC Group pages

New Ham Page

*Send your input to **uvarcshack@gmail.com***

## Test your knowledge

*General and Extra review (answers next page)*

G5B12 : What would be the RMS voltage across a 50 ohm dummy load dissipating 1200 watts?

A. 173 volts
B. 245 volts
C. 346 volts
D. 692 volts

E6FØ6 : Which of these materials is most commonly used to create photoconductive devices?

A. A crystalline semiconductor
B. An ordinary metal
C. A heavy metal
D. A liquid semiconductor


# Calendar

***What's happening***
***(times are Mountain Time)***

## Provo Ham Exam Sessions

*Provo Fire Station #2, 2737 N Canyon Rd*

*Sign up at HamStudy.org/sessions/nv7v*

Wed 19 Jun, 7:00 to 8:00 pm

Wed 17 Jul, 7:00 to 8:00 pm

Wed 21 Aug, 7:00 to 8:00 pm

Wed 18 Sep, 7:00 to 8:00 pm

Sat 21 Sep, 2:30 to 5:00 pm

*Email* ***uvhamtest@gmail.com*** *for info*

## Provo One-day Technician Courses*

Third Saturday Monthly at 8:00 am

*Provo Fire Station #2, 2737 N Canyon Rd*

** September through April*

## 2024 Orem Ham Radio Courses

*Sign up at psclass.orem.org*

Extra: Jul 16, 23, 30, Aug 6, 13

Technician : Sep 17, 24, Oct 1, 8

## Club Meeting Calendar (6:30 pm)

*On YouTube Live, and Facebook Live*

| | |
|---|---|
| June 6 | July 11 † |
| August 1 | September 5 |
| October 3 | November 7 * |

*† Ham Radio Fair, Pheasant Brook Park*

** At the Orem Friendship Center*

## Regular Nets

**UVARC Family Net**, Sun 3:30 pm, 146.780

**NE UC ERC Net**, Sun 9:00 pm, 147.540 (s)

**Health & Fitness Net**, Mon 7 pm, 146.780

**UVARC Ladies' Net**, Tue 7 pm, 146.780

**DMR Utah Net**, Wed 6 pm, TG 3149, CC 1

**Utah 76'ers**, Wed 7 pm, 146.760

**UVARC HF Net**, Wed 9 pm, 28.345 / 7.220

**UVARC New Ham Net**, Thu 7 pm, 146.780

**CERT Ham Net**, 2nd, 4th Thu 8:pm, 146.780

**Utah County 6-meter Net**, Fri 8 pm, 50.140

**Family History Net**, Sat 8 pm, 146.780

See a larger list of nets at noji.com/nets

## Upcoming Contests

***ARRL International Digital Contest***

Noon Sat Jun 1 to 6 pm Sun Jun 2

***ARRL Kids Day***

Noon to 6 pm Sat Jun 15

***ARRL Field Day***

Noon Sat Jun 22 to noon Sun Jun 23

***IARU HF World Championship***

6 am Sat Jul 13 to 6 am Sun Jul 14

See a larger list at contestcalendar.com

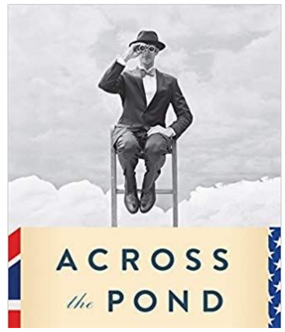
# Answers to *Test your knowledge*

**G5B12** : **B** ( 245 volts )

**E6FØ6** : **A** ( A crystalline semiconductor )

# Across the Pond

***That is, the Utah Lake 'pond'***




## Eagle Mountain ham radio activities

A list of amateur radio activities near Eagle Mountain, organized primarily by Dave Becar KI6OSS. Unless otherwise noted, all these activities will be held at the Eagle Mountain City Hall, 1650 Stagecoach Run. Please contact Dave at **ki6oss6365@gmail.com** to register for any of the classes or exams, for any additional information, or questions in general.

### May / June 2024 Technician Course

Thu 23 May, 7 to 9 pm
Thu 30 May, 7 to 9 pm
Thu 06 June, 7 to 9 pm
Thu 13 June, 7 to 9 pm
Thu 20 June, 7 to 9 pm

### Ham Radio Exam Session

Sat 22 June, 10 am
*Open to all, for any license class*

### September 2024 Technician Course

Thu 29 August, 7 to 9 pm
Thu 05 September, 7 to 9 pm
Thu 12 September, 7 to 9 pm
Thu 19 September, 7 to 9 pm
Thu 26 September, 7 to 9 pm

### Ham Radio Exam Sessions

Sat 21 September, 10 am (Swap Meet)
Sat 28 September, 10 am
*Open to all, for any license class*

---

### Ham Radio Nets

**Eagle Mountain ECT Net**
Sundays, 9 pm 147.220– MHz (151.4 Hz)

**Eagle Mountain Chimney Rock Stake**
Sundays 8:30 pm 446.500 (s)

**Eagle Mountain Central Stake**
Saturday 8 pm 145.650 (s)

# Vendors

## *For your convenience*


**Pockrus Joystick J-pole**

$30, open-stub aluminum half-wave, dual-band J-pole antenna

$40, 6-meter dipole, $20 for the 220 MHz (1.25 m) antenna

by Carl Pockrus, WE7OMG (email omgantennas@gmail.com to order)

Half-wave performance, solid construction, weather-proof, low wind-load

*Probably the best-performing outdoor antenna you can get for the price*

---

**Super-Elastic Signal Stick**

$22, vertical quarter-wave flexible antenna

by Richard Bateman, KD7BBC, of *SignalStuff* (and maker of *HamStudy*)

Super-performing antenna for your HT (handheld transceiver)

Visit SignalStuff and select SMA-Male, SMA-Female, or BNC

---

**Ham Radio Podcasts v1.50**

by Trevor Holyoak, AG7GX (email android@holyoak.com)

Stream podcasts (such as *100 Watts and a Wire*, *Amateur Radio Newsline*, *ARRL Audio News*, etc.) or download for later listening

For Android 4.1 and up (ad-free available for purchase)

---

**Club Logo and Call Sign Embroidering**


Want your call sign or name (or both!) embroidered on your shirt, your hoodie, your duffle? Or how about a club patch with your call sign?

by Glenna Gardner, WE7SEW (glenna0354@gmail.com or text 801-592-2503)

Call sign or name = $5, Both = $8, UVARC patch = $5, Patch with call = $9

---

**Portable Aluminum J-pole**

$60, sectioned, open-stub aluminum half-wave, dual-band J-pole antenna

by Stan, KJ7BDV and Kent, N7EKF (email skantenna@yahoo.com for info or call 801-372-7260)

Complete antenna breaks down into a compact 2˝ x 6˝ x 12˝ package weighing only 3 lbs, perfect for backpacking and portable work where you really need a good 2-meter antenna

---

**HamBadgers**


Amateur radio name badges and other products

$10, official UVARC ham radio name badge with the club logo

Visit Ham Badgers and select Ham Radio Clubs > Utah Valley Amateur Radio Club

Email Eric Palmatier at hambadgers@gmail.com or call 919-249-8704

*Where everybody knows your call sign*

*Utah Valley Amateur Radio Club*
PO Box 1288
Orem, Utah, 84059-1288 USA

K7UVA
Phone/Text: 801-368-1865
Email: k7uva@arrl.net

Repeaters: 146.780–, 100.0
448.200–, 100.0 224.560–, 100.0
145.250–, 100.0 448.225–, 100.0
Newsletter input?
Email uvarcshack @ gmail.com
Need help?
Email uvarcelmer @ gmail.com

See all our newsletters on uvarc.club

We are the *Utah Valley Amateur Radio Club*, a 501(c)(3) non-profit (EIN 81-360-6416) Utah corporation (9752825-0140) that was organized in an obscure Orem fire station on 02-05-2016 to provide amateur radio enthusiasts in Utah County and surrounding areas a way to gather and discuss all things ham. Our primary purposes are to provide a local amateur radio resource, help new hams in their new-found adventures, and to give more experienced hams a reason to share their wealth of knowledge and wisdom in a friendly atmosphere of fellowship. We're an ARRL Affiliate and work in cooperation with the Utah VHF Society, but are not subsidiary to them, to ARRL, ARES, or any other organization, although many of our members and leaders might also belong to the same.

 To join, go to uvarc.club/join, then sign up at www.facebook.com/groups/uvarc/ to stay informed. For more information about our club or about amateur (ham) radio in general, please email or text or call us.

*More than just a club, we invite you to become part of a great ham radio friendship in Utah Valley*

## Our fearless leadership

### Presidency

President........................... Noji Ratzlaff
Vice President............... Chad Buttars
Secretary........................ Caryn Alarcon
Activities.................. Michele Costello
Technology................ Trevor Holyoak

### Board of Directors

Richard Bateman, KD7BBC
Carl Pockrus, WE7OMG
Aubrey Mikkelsen, K7GUM
Jeff McGrath, N1SC
Jody Dollar, K7BUX
Jeremy Giovannoni, K7TEH
Brad Kirk, AF7FP
Alma Perry, W1ZGY
Loren Chandler, WB1KE
James Brown, W7JHB
Harry English, AA1HE

### Club Sponsor

Heath Stevenson, KK7KOU
Orem City Emergency Manager

From all of us to you, 73

*It's starting to get pretty crowded in the Orem City Council Chamber Room, especially with the unabated growth of club membership. With the construction of a new city administration building on the corner of State and Center, Orem assures us that we'll have a lot more than standing room to hold our gatherings.*